formation was to be had. The weather forecasters, nevertheless, were able to pick favorable times for the trips both coming and going. The encounters with thunderstorms on the American coast, and the danger of ignition of the hydrogen by lightning have caused a call for thunderstorm statistics over the oceans. Fortunately, thunderstorms are much less numerous on coasts than inland. The danger to trans-oceanic dirigibles, however, is present the year round, and both night and day, for land thunderstorms, which may drift a short distance out to sea occur mostly by day in summer, and ocean thunderstorms occur mostly at night and in winter. Mr. W. R. Gregg, the Weather Bureau representative at Mineola during the stay of the R34, has prepared an account of the meteorological aspects of the voyage of the R34.[13]

I quote from his synopsis:

> The British dirigible R34 flew from the British Isles to the United States in 108 hours and made the return trip in 75 hours, a good illustration of the influence of the prevailing westerlies in trans-Atlantic flight. During the first day of the westward trip northeasterly and easterly winds furnished some assistance, but thereafter cross winds or head winds were encountered most of the time. On the return trip southwesterly and westerly winds added considerably to the air speed of the ship. Inasmuch as it was necessary to moor the ship in the open at Roosevelt Field [it was necessary to guard against] . . . the sea breeze, thunder-storms, and alternate heating and cooling of the gas through the interruption of insolation by passing clouds.

The British have now taken steps to inaugurate a radio collecting and issuing system for weather reports and forecasts for marine and aeronautical interests in all parts of the world.[14]

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[13] *Monthly Weather Review*, August, 1919; daily North Atlantic weather maps by F. A. Young in July issue.

[14] See *Symon's Meteorological Mag.*, May, 1919, pp. 37–38; noted in *Geog. Rev.*, June, 1919, p. 421, and reprinted in *Mo. Weather Rev.*, June, 1919, p. 417.

SPECIAL ARTICLES

NEW FRUIT FUNGI FOUND ON THE CHICAGO MARKET

THE present paper gives a description of the diseases as they were seen on the fruit rather than a study of the fungus itself.

The new fruit diseases found on the Chicago market are as follows: a new *Botrytis* on apple, *Polyscytalum* on grapefruit and *Fusarium* on grapefruit.

Botrytis sp. was first isolated from a northwestern Spitzenburg, and later found on northwestern Arkansas Black and Winesap. Five Spitzenburg apples affected with *Botrytis* were taken from the same box.

The affected Spitzenburgs were entirely rotted. The apples were very soft but the rot was firmer than that produced by *Penicillium*. The pigments of the skin had stained the underlying tissues to a depth of a quarter of an inch. The apples were covered with a very fine white growth of decumbent mycelium.

In 1918 *Botrytis* sp. was studied at the University of Illinois. The species of *Botrytis* was isolated from an apple covered with a thick, heavy growth of grayish mycelium. The fungus tufts arose a half an inch from the surface of the apple. Inoculations of conidiospores upon disease free fruit produced similar growths. The conidiospores averaged 6μ in diameter. The conidiospores of the *Botrytis* in the present paper averaged 4μ in diameter. As far as the writer has been able to learn, no *Botrytis* of this dscription has ever been recorded.

The perfect and the imperfect stage of *Botrytis* sp. develops in the same culture tube. The asci are arranged in a layer which constitutes a convex hymenium. The hymenium is formed on a very loose structure of mycelium. Paraphyses are present. There were no ascospores produced during the four months the fungus was under observation. The asci averaged 51μ x 11.5μ. Sclerotia are seen in culture with the naked eye at the end of two weeks.

Five series of inoculation tests were made using the Spitzenburg variety of apple. Ten apples were used each time. Care was taken

to have the apples in as sterile a condition as possible. The apples were washed thoroughly in tap water, allowed to remain in mercuric chloride (1: 1,000) for five minutes, washed in water that had been boiled, then rinsed in 95 per cent. alcohol. Two punctures were made on each apple with a sterile platinum needle. The inoculum of conidiospores was applied to each puncture with a sterile loop needle. The inoculated apples were placed in a sterile granite pan and covered over with a similar pan. The total diameter in millimeters of the spots on the ten apples was recorded. The five series of inoculations were averaged and the results recorded in the following table:

Apples inoculated on May 10: May 13, 140 mm.; May 15, 414 mm.; May 17, 788 mm.; May 19, 1,060 mm.; May 21, 1,386 mm.

POLYSCYTALUM ON GRAPEFRUIT

Polyscytalum has only been found on the market three times and as yet is not a disease of importance.

The fungus was isolated from a slightly sunken soft area one half an inch in diameter. The spot was of a little lighter color than the color of the fruit itself. The spot has the appearance of a blister filled with water. In the early stages of the disease the rot works down to the pulp of the fruit in a perpendicular manner. The affected tissue is very soft, more so than that attacked by *Penicillium*. When a spot has reached the diameter of 20 or 25 millimeters the fungus begins to attack the pulp of the fruit. An attacked fruit soon becomes a soft mushy mass.

Five series of inoculations were made using four grapefruits in each series. The average development of a spot is shown as follows: fruit inoculated May 10, May 17, 55 mm.; May 19, 49 mm.; May 21, 70 mm.; May 23, 91 mm.

GRAPEFRUIT FUSARIUM

Fusarium sp. was first found on a shipment of Florida grapefruit. The fungus was found enough on the Chicago market to classify it as a disease of economic importance.

The isolation was made from a tan to reddish brown rough sunken area an inch in diameter. The tissue underneath was dry, corky, and of a tan color extending inward an eighth of an inch. These rough sunken areas often reach the size of two and a half by one and a half inches. In the case of the larger spots the fungus often develops down into the pulp of the fruit causing a rot. A black and pink development is made in the host tissue. A very fine white cottony growth often develops in the pulp of the fruit and sometimes on the surface of the brown rough area.

Ten series of inoculations were made using three grapefruit in each inoculation. The average growth of a spot is shown as follows: fruit inoculated April 24, May 1, 5 mm. in diameter; May 19, 10 mm.; May 29, 17 mm.; June 2, 20 mm. It is seen that a *Fusarium* spot develops very slowly. However, in fifty per cent. of the inoculations when a spot had reached a diameter of twenty of twenty-five millimeters a rot developed at the edge of the sunken area. When *Fusarium* acts in this manner it is very serious, for a grapefruit will be a worthless rotten mass within forty-eight hours after the rot has started.

In order to discover what fruit diseases are of economic importance one has to study them from a market point of view as well as in the field. Some diseases are field infections which develop and spread under transit and storage conditions. A more complete study of fruit diseases as occuring on the market will reveal many diseases as yet unknown to plant pathologists.

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